

Dillwynella voightae new species, a new skeneimorph gastropod (Turbinidae) from the western Atlantic and a new record of *Dillwynella modesta* (Dall, 1889)

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ABSTRACT

Dillwynella is a marine gastropod genus found on natural wood falls and sunken algal holdfasts in the Caribbean Sea and the Pacific Ocean. *Dillwynella voightae* new species from the Gulf of Mexico was the second species found in the Atlantic. Previously known only from two localities in the Caribbean Sea, *D. modesta* (Dall, 1889) has now been recorded at a third site, off southeastern Brazil.

Additional keywords: Bathyal, deep sea, Skeneidae, wood fall

INTRODUCTION

Dillwynella modesta (Dall, 1889) was originally described as *Teinostoma (Dillwynella) modesta* (Dall, 1889a), in the family Trochidae. Later in the same year, Dall changed the status of *Dillwynella* to a full genus within the Trochidae (Dall, 1889b). The species was described from off St. Lucia (13°51.30' N, 61°03.45' W; Smith, 1889: 968), on coarse sand at a depth of 413 meters (Dall, 1889a). Marshall (1988) mentioned that at the same station the wood ingesting limpet *Pectinodonta arcuata* Dall, 1882 was also found, therefore both species may have lived originally on wood (Marshall, 1988). A second record of 5 specimens of *D. modesta* from off the coast of Georgia, USA (Dall, 1927) was given, but the specimens are mostly immature (Dall, 1927) and, according to Warén (pers. com.), in a very bad condition. Nowadays, the genus *Dillwynella* is referred to the subfamily Skeneinae, family Turbinidae (Marshall, 1988; Bouchet & Rocroi, 2005). Williams and Ozawa (2006) placed the Turbinidae inside the vetigastropod super-

family Trochoidea. This is the third record of *D. modesta* since the type lot was recorded. It is the first time that this species has been found south of the Caribbean Sea.

Marshall (1988) described *Dillwynella lignicola*, *Dillwynella haptricola*, and *Dillwynella ingens* from the New Zealand region. Hasegawa (1997) added the following four species from the Suruga Bay to this genus: *Dillwynella vitrea*, *Dillwynella planorbis*, *Dillwynella fallax* and *Dillwynella sheisinmaruae*. Macrophotographs of the species described by Hasegawa are illustrated in Okutani (2000: 84–85). All these species of *Dillwynella* were associated with sunken wood, except *Dillwynella haptricola* Marshall, 1988, which lives on sunken algal holdfast (Marshall, 1988) in depths of 529–1200 m.

Ganesa panamensis Dall, 1902 may be a ninth species included in the genus *Dillwynella*. It was found in the Gulf of Panama at a depth of 1865 meters in mud and has never been found outside this type locality. In his description and figure five years later, Dall (1902; 1908) recorded the genus with a question mark and stated his uncertainty about the status of *Ganesa*. The shell figured (Dall, 1902: pl. 19, fig. 4) resembles that of a *Dillwynella* species. If it were to be reclassified within *Dillwynella*, not only it would be the first species of this genus found in the eastern Pacific, but would also be the deepest occurring one.

Dillwynella voightae new species is the second species of this genus described from the Atlantic region.

MATERIALS AND METHODS

The specimens were fixed in formaldehyde and preserved in ethanol. Pictures of the shells with soft parts in ethanol and of the dried shell were taken with a

macro objective and digital camera. After drying of the specimen, the body was pushed into the shell gently, with a needle, to disconnect the columellar muscle. Afterward, the shell with the soft parts was rehydrated in a solution of water and very little dishwashing liquid. With a hooked needle, the body was then pulled out of the shell (Geiger et al., 2007). For the scanning electron microscope (SEM), the rehydrated soft parts were critical-point dried. To facilitate acquisition of more information on the soft parts, the mantle roof was removed after the first SEM session and mounted separately. Both the soft parts (without the mantle roof) and the mantle roof itself were examined again under SEM. After image-acquisition of the body under SEM, the head-foot was dissolved in KOH and the radula cleaned and mounted for SEM. For the SEM of the shell (paratype), the operculum and the radula were air dried. All SEM specimens were coated twice with gold from different orientation, for 180 seconds.

Institutional abbreviations used are: FMNH: The Field Museum of Natural History, Chicago, USA; MNHN: Muséum National d'Histoire Naturelle, Paris, France; and USNM: National Museum of Natural History, Washington, DC, USA.

SYSTEMATICS

Family Turbinidae Rafinesque, 1815

Subfamily Skeneinae Clark, 1851

Genus *Dillwynella* Dall, 1889

Type Species: *Dillwynella modesta* (Dall, 1889) (by subsequent lectotype designation of Marshall, 1988)

Dillwynella voightae new species
(Figures 1–4, 10–20)

Description: Protoconch (paratype, Figures 10–11): Most specimens badly corroded. Pictures of protoconch (Figure 11) are taken from a juvenile specimen (shell diameter = 1.5 mm). Protoconch 390 μ m maximum diameter, 0.5 whorls, covered by a thick deposit, hiding all structures. Teleoconch (holotype, Figures 1–4): Adult shell with 2.7 whorls, large (diameter 5.8 mm, height 4.8 mm), rather thin and fine, color pure white. Teleoconch smooth, except for growth lines, which are prosocline and cover entire teleoconch. Suture distinct and narrow, getting a little deeper on first half whorl. First quarter of apical teleoconch whorl with a median, strong, spiral rib starting quite strong at the border of protoconch and teleoconch, fading out and disappearing (Figure 11). Umbilicus a narrow chink, demarcated by inner lip, distinct, elongated, oval, and deep. Aperture moderately D-shaped. Parietal callus thin. Lower part of the outer lip broad. Parietal glaze thin.

OPERCULUM (Holotype, Figures 4, 12): Diameter 2.8 mm, multispiral, moderately thick, short growth edge; yellow, partly brownish, translucent at outer edge.



Figures 1–4. *Dillwynella voightae* new species (holotype, FMNH 312467, Gulf of Mexico, 5.8 mm width).



Figures 5–9. *Dillwynella modesta* (Dall, 1889). 5–6. Lectotype (USNM 859220, off St. Lucia, 3.9 mm width). Photos by A. Warén. 7–9. MNHN unnumbered, off southeastern Brazil, 3.1 mm width).

RADULA (Holotype, Figures 16–18): Formula n-5-1-5-n, length 3.5 mm, width 300 μ m. Central tooth large, with broad and smooth cutting edges, shaft reduced to a low ridge, not hooked at tip. Lateral teeth longer than broad, outer teeth getting larger, S-shaped, tip strongly hooked, cutting area long and smooth. Marginal teeth slender, elongated and simple, with smooth edge, strongly hooked at tip. Third to fourth marginal teeth longest, getting shorter and narrower laterally. Jaws present, with prismatic elements, thin (Figure 20).

GROSS ANATOMY (Holotype, Figure 13–15): Body flesh-colored; snout broad and flat; cephalic tentacles broad at basis, getting long and slender at tip, with sensory papillae. Large, V-shaped propodium. [Due to drying and rehydration of soft parts, small structures like eye-stalks and suboptic tentacles were stuck together and could not be seen.] Four epipodial tentacles on each side of mesopodium. Three epipodial tentacles, relatively short, conical shaped with laterally placed sensory papillae. First one has attached a small accessory tentacle, which is smooth and small, without sensory papillae (epipodial sense organ). Large number of sensory papillae present on mantle edge and mantle roof. [Attempts to separate the mantle roof from the soft parts caused exposure of gut contents, which consisted of wood fibers (Figure 19).

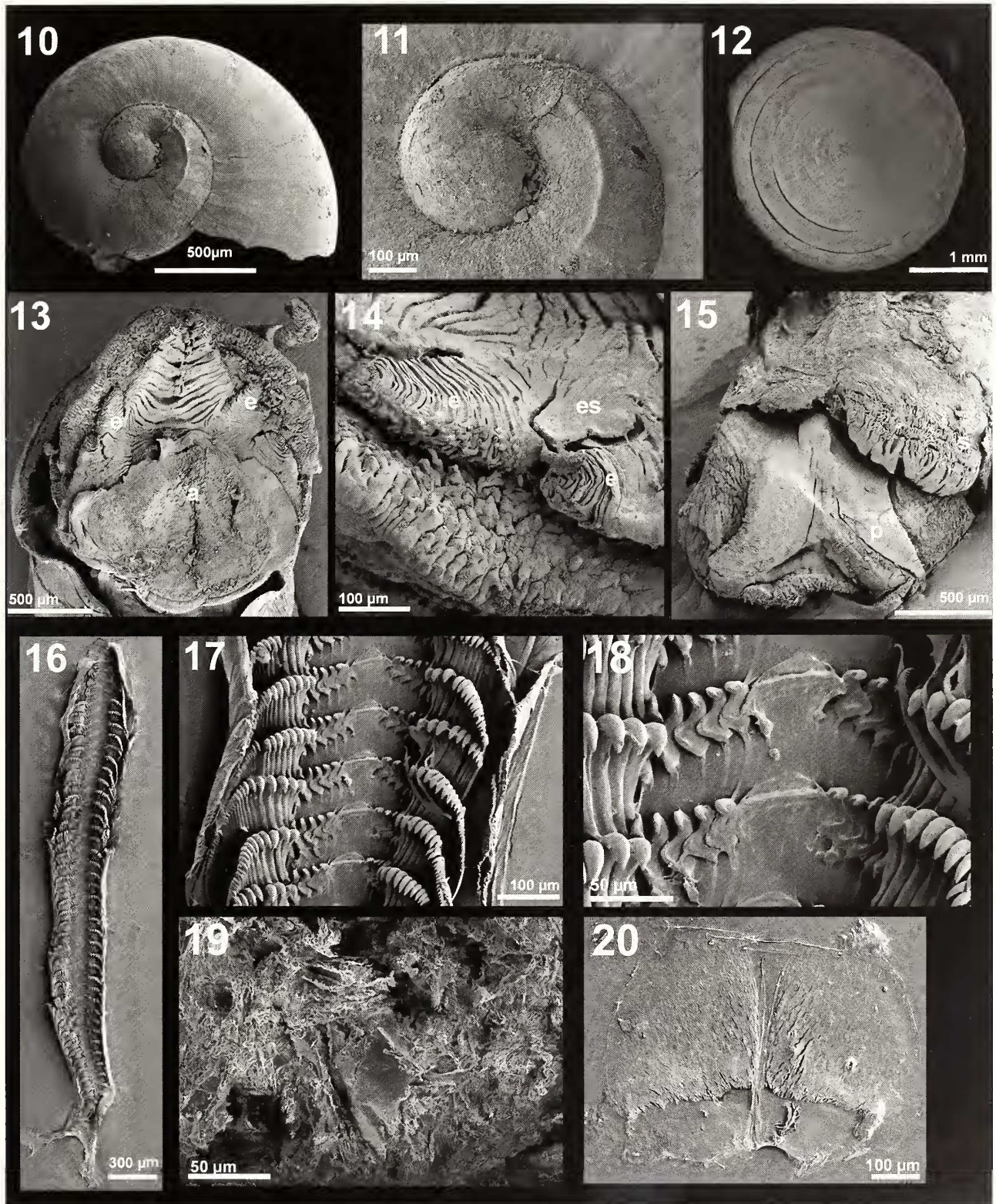
Type Material: Holotype: A dried shell, FMNH 312467 (Figures 1–4, 12–20). Paratypes: 16 specimens in ethanol, FMNH 312220, 1 juvenile shell dried, used for SEM pictures of the protoconch, FMNH 312468 (Figures 10–11).

Type Locality: North Atlantic, Gulf of Mexico, Louisiana, U.S.A. (27°44.09' N, 91°14.49' W), natural wood fall, 610 m depth. The sample was taken by the grab of the DSV JOHNSON-SEA LINK I (operating from R/V SEWARD JOHNSON), 19 Aug. 2006.

Material Preservation: The specimens were fixed in formalin and stored afterward in 70% ethanol.

Etymology: Named after Dr. Janet R. Voight, Field Museum of Natural History, who collected the specimens.

Comparative Remarks: *Dillwynella voightae* new species is the largest described species of this genus. The teleoconch resembles *Dillwynella vitrea* Hasegawa, 1997, *D. laptricola* Marshall, 1988, and *D. modesta* (Dall, 1889). These four species have a distinct, median strong spiral rib on the beginning of the protoconch and have no ribs in the area around the umbilicus. *Dillwynella vitrea*, *D. laptricola*, and *D. voightae* differ by the shape of their umbilicus. *Dillwynella vitrea* has a distinct big umbilicus, whereas *D. voightae* shows a narrow chink, and *D. laptricola* a small chink almost closed by its thin inner lip. *Dillwynella modesta* (Figures 5–9; SEM images: Marshall, 1988: fig. 2: D–E) differs by lacking an umbilicus.



Figures 10–20. *Dillwynella voightae* new species. 10–11. Juvenile specimen shell (paratype, FMNH 312220, shell 2.9 mm width). 10. Shell. 11. Protoconch of juvenile specimen shell. 12–20. Holotype (FMNH 312467, 5.8 mm width). 12. Operculum. 13. Ventral view of foot. 14. Epipodial tentacles and epipodial sense organs. 15. Lateral view of soft parts with propodium and snout. 16–18. Radula. 19. Gut content. 20. Jaw. Abbreviations: a, attachment area of the operculum; e, epipodial tentacle; es, epipodial sense organ; s, snout; p, propodium.

Distribution: Known only from type locality.

Remarks: The wood fibers in the gut show that *D. voightae* feeds directly on wood and grazes not only on the bacteria film.

Dillwynella modesta (Dall, 1889)

Type Material: Lectotype: A dried shell, USNM 859220 (Marshall, 1988; originally syntype USNM 95077, after Dall, 1889a), illustrated in Dall (1889a), macrophotographs (Figures 5–6). Paralectotype: A dried shell, USNM 95077; SEM pictures in Marshall (1988: 958, 993).

Type Locality: St. Lucia at BLAKE Station 205 coarse sand in 413 meters depth.

Material Examined: Two dry specimens, one empty shell, and one shell with soft parts, MNHN (Figures 7–9), off southeastern Brazil (23°47' S, 42°10' W), N.O. MARION DUFRESNE, Cruise MD 55, Bouchet, Leal, and Métivier coll. May 1987, sta. CB105, 610 m depth.

Distribution: Western Atlantic from Gulf of Mexico to Brazil, but only known from three localities.

Remarks: The specimens of *Dillwynella modesta* found off Brazil (Figures 7–9) are quite similar to the types. This is the second finding of this species and shows its wide distribution. Unfortunately, there are no data available for the substrate of the specimens.

DISCUSSION

The presence of an epipodial sense organ at the base of the papillate epipodial tentacles, described by Crisp (1981) and histology shown for microgastropods in Kunze et al. (2008), underlines the position of this genus in the Trochoidea/Turbinioidea (Bouchet and Rocroi, 2005). To solve its precise position in this group and confirm the position in the Skeneinae more information like microanatomy or sequencing are needed. The new record of *Dillwynella modesta* shows its wide occurrence in the western Atlantic. It also demonstrates how rare and incomplete the records of sunken wood species are in this area.

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